MITSUBISHI

Control & Communication Link System Master/Local Module

User's Manual

(Hardware)

AJ61QBT11
A1SJ61QBT11

Thank you for buying the Mitsubishi general-purpose programmable logic controller MELSEC-QnA Series

Prior to use, please read both this manual and detailed manual thoroughly and familiarize yourself with the product.

QnA
MELSEC

MODEL	AJ61QBT11-U-H-JE
MODEL CODE	13JT19
IB(NA)-0800147-D(0706)MEE	

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● SAFETY PRECAUTIONS ●

(Always read before starting use)

When using this equipment, thoroughly read this manual. Also pay careful attention to safety and handle the module properly.
These precautions apply only to this equipment.
Refer to the user's manual of the CPU module to use for a description of the PLC system safety precautions.
These "Safety Precautions" classify the safety precautions into two categories: "DANGER" and "CAUTION".

⚠DANGER	Procedures which may lead to a dangerous condition and cause death or serious injury, if not carried out properly.
⚠CAUTION	Procedures which may lead to a dangerous condition and cause superficial to medium injury, or physical damage only, if not carried out properly.

Depending on circumstances, procedures indicated by **⚠CAUTION** may also be linked to serious results.
In any case, it is important to follow the directions for usage.
Store this manual in a safe place so that you can take it out and read it whenever necessary. Always forward it to the end user.

[DESIGN PRECAUTIONS]

⚠DANGER

- Read Chapter 5 in this manual carefully for status of each station when the PLC CPU has stopped its operation and when a communication error occurred in the data link.
  Configure an interlocking circuit in a sequence program using the communication status information (SB, SW) so that the safety of the overall system is always maintained.
  Accident may occur due to output error or malfunctioning.
- The master station or local station cannot detect errors when a station specified as an error-invalidated station becomes communication error.

⚠CAUTION

- Do not bundle, on install, the control cables and communication cables with, or near, main circuit and power cables. Keep them at least 100 mm (3.9 in.) away from such cables. Noise may cause erroneous operation.

[INSTALLATION PRECAUTIONS]

⚠CAUTION

- Use the PLC in the environment given in the general specifications section of the User's manual for CPU module being used. Using the PLC outside the range of the general specifications may result in electric shock, fire or erroneous operation or may damage or degrade the product.
- Insert the tabs at the bottom of the module into the holes in the base unit before installing the module. Improper installation may cause erroneous operation, accidents, or the module to fall out.
- Do not touch the electronic parts or the module conduction area. It may cause erroneous operation or failure.

[WIRING PRECAUTIONS]

⚠DANGER

- Before beginning any installation or wiring work, make sure all phases of the power supply have been obstructed from the outside. Failing to completely shut out the power supply phases could cause electrical shock and/or damage to the product.
- Following installation or wiring work, when turning on the power supply and operating the equipment, make sure the terminal cover provided as an accessory has been attached to the product.
  Failure to attach the terminal covers may result in malfunction.

⚠CAUTION

- Use applicable solderless terminals and tighten them with the specified torque. If any solderless spade terminal is used, it may be removed when the terminal screw comes loose, resulting in failure.
- Tighten the terminal screws to the specified torque. Loose terminal screws may cause a short circuit or erroneous operation.
- Be sure that cuttings, wire chips, or other foreign matter do not enter the module. Foreign matter may start a fire or cause an accident or erroneous operation.
- Always place electric wires or cables connected to the module in ducts or fix them with clamps.
  If not, dangling cables may be shifted or inadvertently pulled, resulting in damages to the module or cables or malfunctions due to poor cable contact.
- Do not install the control cables and communication cables together and not let them close to each other.
  Doing so may cause malfunction due to noise.

[WIRING PRECAUTIONS]

⚠CAUTION
● Do not grab on the cable when removing the communication cable connected to the module. When removing the cable with a connector, hold the connector on the side that is connected to the module. When removing the cable without a connector, loose the screws on the side that is connected to the module. Pulling the cable that is still connected to the module may cause malfunction due to bad cable contacts.

[STARTING AND MAINTENANCE PRECAUTIONS]

⚠DANGER
● Do not touch terminals without obstructing all power supply from the outside. It may cause malfunction. ● Turn off the power before cleaning the module or retightening the screws. Doing this work while the power is on may damage the module or cause erroneous operation. ● Do not disassemble or rebuild the module. It may cause accidents, erroneous operation, injury, or fire. ● Turn off the power before mounting and dismounting the module. Mounting or dismounting the module while the power is on may damage the module or cause erroneous operation.

[DISPOSAL PRECAUTIONS]

⚠CAUTION
● When disposing of this product, treat it as industrial waste.

Revisions

* The manual number is noted at the lower right of the top cover.

Print Date	*Manual Number	Revision
Jul.,2000	IB(NA)-0800147-A	First printing
Nov.,2000	IB(NA)-0800147-B	Partial correction Contact address (Back cover)
Mar.,2006	IB(NA)-0800147-C	Partial correction SAFETYPRECAUTIONS, Conformation to the EMC Directive and Low Voltage Instruction, Section 1.1, 2.1, 5.1
Jun.,2007	IB(NA)-0800147-D	Partial correction Section 3, 6.1, 6.2, Contact address (Back cover)

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About the Manuals

The following product are available for this equipment.
Refer to the table given below to choose suitable manuals.

Related Manual

Manual name	Manual No. (Model code)
Control & Communication Link System Master/Local Module type AJ61QBT11/A1SJ61QBT11 User's Manual	IB-66722 (13J873)

Conformation to the EMC Directive and Low Voltage Instruction

When incorporating a Mitsubishi PLC that is compliant with the EMC and low voltage directives into any other product and ensuring compliance with these directives, refer to Chapter 3 "EMC and Low Voltage Directives" of the User's Manual (Hardware) for the PLC CPU included with the CPU module or base unit.

A module compliant with the EMC and low voltage directives bears a CE mark logo printed on the rating plate.

To make this product compliant with the EMC and low voltage directives, refer to "CC-Link module" in Chapter 3 "EMC and Low Voltage Directives" of the User's Manual (Hardware) for the CPU module.

1. Overview

This manual describes the specifications, name of each part, settings, etc., of the AJ61QBT11 Control & Communication Link System Master/Local Module (hereafter abbreviated as AJ61QBT11) and A1SJ61QBT11 Control & Communication Link System Master/Local Module (hereafter abbreviated as A1SJ61QBT11) to be used in combination with the MELSEC-QnA series PLC CPU.
In this manual, Control & Communication Link is abbreviated as CC-Link.
Confirm if the following items are included in the package after unpacking.

Item name		Number of items
CC-Link System Master/Local Module type AJ61QBT11	AJ61QBT11 main module	1
	Terminal resistor 110Ω 1/2W (Brown-brown-brown)	2
	Terminal resistor 130Ω 1/2W (Brown-orange-brown)	2
CC-Link System Master/Local Module type A1SJ61QBT11	A1SJ61QBT11 main module	1
	Terminal resistor 110Ω 1/2W (Brown-brown-brown)	2
	Terminal resistor 130Ω 1/2W (Brown-orange-brown)	2

1.1 Definition of Ver.1.10

The module of which the cable length between station and station is uniformly 20cm or more by improving the conventional limit of the cable length between station and station is defined as Ver.1.10.
The conventional modules are defined as Ver.1.00.
The conditions for setting the cable length between station and station uniformly to 20cm or more are indicated below.

1) All modules configuring the CC-Link system must use Version 1.10.
2) All data link cables must be Version 1.10 compatible CC-Link dedicated cable.

Point
In the case of the system containing modules of both Ver.1.00 and Ver.1.10, the maximum overall cable length and the station-to-station cable length must meet the specifications for Ver.1.00.

(1) Checking Version 1.10

The “CC-Link” logo is stamped on the “plate” for the Version 1.10 modules.

2. Performance Specification

2.1 Performance specification

The following shows the performance specification of the AJ61QBT11 and A1SJ61QBT11. Refer to the CPU module User's Manual to be used for general specification of AJ61QBT11 and A1SJ61QBT11.

Item	Specification
Transmission speed	156kbps/625kbps/2.5Mbps/5Mbps/10Mbps selectable
Maximum overall cable distance	It differs depending on transmission speed (Refer to Section 2.1.1)
Maximum number of modules that can be connected (when master station)	64 units However, the following conditions must be met: $\{(1 \times a) + (2 \times b) + (3 \times c) + (4 \times d)\} \leq 64$ a: The number of occupied modules by station 1. b: The number of occupied modules by station 2. c: The number of occupied modules by station 3. d: The number of occupied modules by station 4. $\{(16 \times A) + (54 \times B) + (88 \times C)\} \leq 2304$ A: Remote I/O station's numbers $\leq$ 64 B: Remote device station's numbers $\leq$ 42 C: Local station's ,standby master station's and intelligent device station's numbers $\leq$ 26
Number of occupied stations (When local station)	1 station to 4 stations (Switched by DIP switch)
Maximum link points per system	Remote I/O (RX, RY): 2048 points Remote register (RWw): 256 points (master station → remote/local station) Remote register (RWr): 256 points (remote/local station → master station)
Link point per remote station/local station	Remote I/O (RX, RY): 32 points (local station 30 points) Remote register (RWw): 4 points (master station → remote/local station) Remote register (RWr): 4 points (remote/local station → master station)
Communication method	Broadcast polling method
Synchronous method	Frame synchronous method
Signed method	NRZI method
Transmission path	Bus (RS-485)
Transmission format	Conform to HDLC
Error control system	CRC ($X^{16}+X^{12}+X^5+1$)
Cable	CC-Link dedicated cable/CC-Link dedicated high-performance cable /Version 1.10 compatible CC-Link dedicated cable*
RAS function	• Auto return function • Slave station cutoff function • Link special relay/Error detection by register
Parameter entry numbers for E^2PROM	10000 times
I/O occupied points number	32 points (I/O allocation: special 32 points)
Internal consumption current (5VDC) (A)	AJ61QBT11:0.45, A1SJ61QBT11:0.4
Weight [kg]	AJ61QBT11:0.4 , A1SJ61QBT11:0.25

* Each of Ver.1.10 compatible CC-Link cables, CC-Link dedicated cables (Ver.1.00), and CC-Link dedicated high-performance cables cannot be used together with other cable types.
Also attach the terminator which matches the kind of the cable.

2.1.1 Maximum overall cable distance

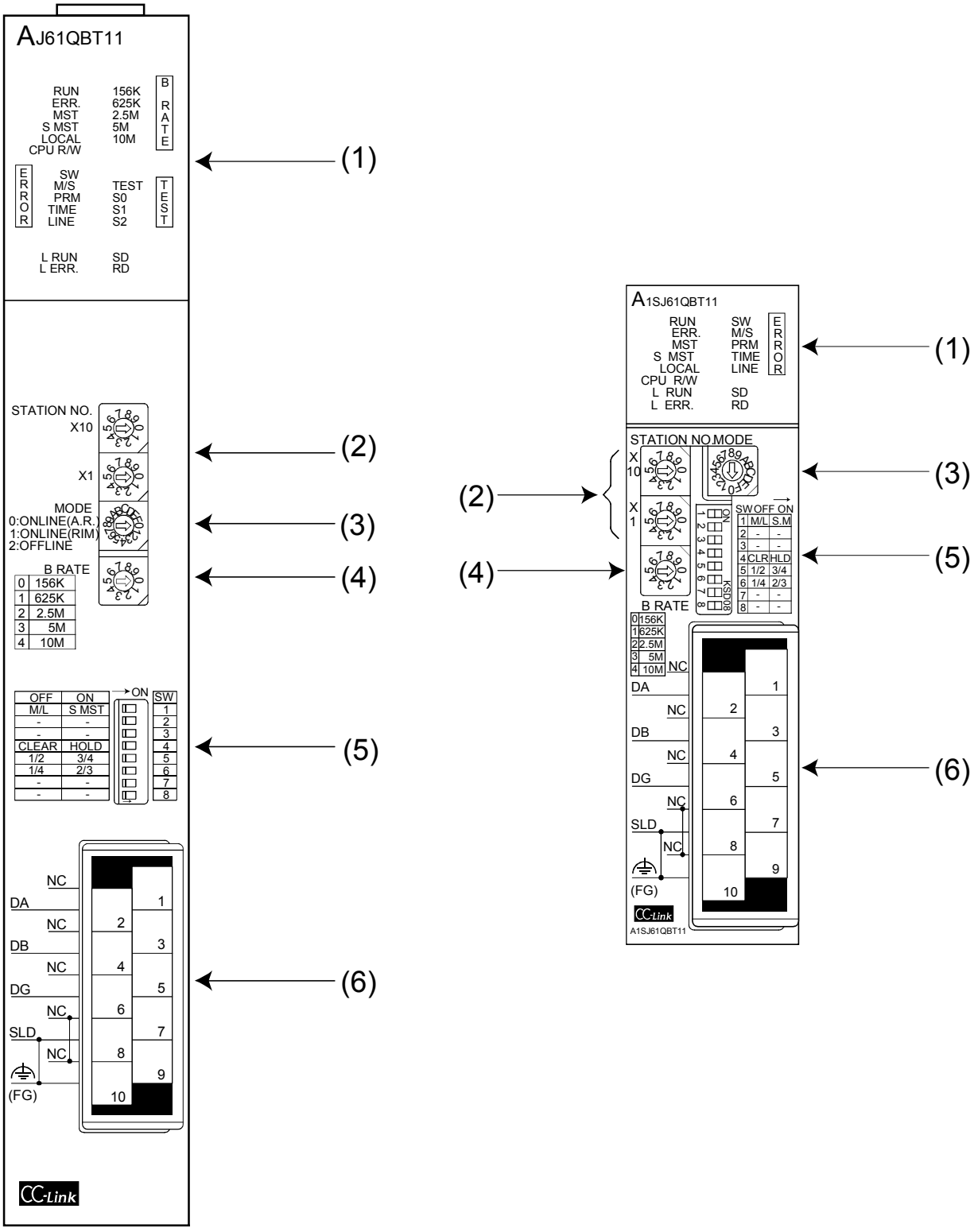
The maximum overall cable distance differs according to the transmission speed.
For the relationship between the transmission speed and maximum overall cable distance, refer to CC-Link Catalog.

2.2 CC-Link dedicated cable

Use the CC-Link dedicated cables in a CC-Link system.
The performance of the CC-Link system cannot be guaranteed with cables other than the CC-Link dedicated cables.
For the specifications of the CC-Link dedicated cable and the reference office, refer to CC-Link catalog.

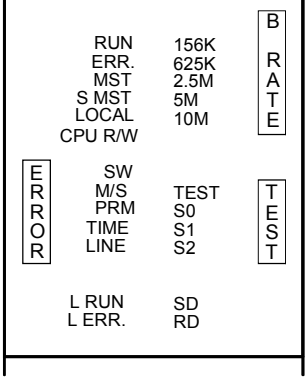
3. Name and Setting of Each Component

This section explains the name and setting of each component of AJ61QBT11 and A1SJ61QBT11.

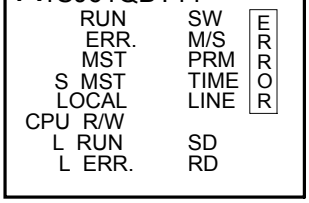


Number	Name	Description		
(1)	LED display	Data link status can be confirmed by LED's ON state.		
		LED display		Description
		RUN		ON: When module is normal. OFF: When watchdog timer error.
		ERR.		ON: All stations communication error. Blink: Communication error occured in the station.
		MST		ON: It is set at the master station.
		S MST		ON: It is set at the standby master station.
		LOCAL		ON: It is set at the local station.
		CPU R/W		ON: It is communicating with PLC CPU. (FROM/TO)
		ERROR	SW	ON: Settings for switches are not normal.
			M/S	ON: Master station is overlapped on the same line.
			PRM	ON: An error occurred in the parameter content.
			TIME	ON: Data link monitor timer is started.
			LINE	ON Cables are disconnected or transmission path is affected by noise, etc.
		L RUN		ON: Data link is operating. (host station)
		L ERR.		ON: Communication error (host station). Blink: The settings of switches 2 to 5 are changed during the power supply ON.
		BRATE	156K	ON: When transmission speed is set to "156kbps".
			625K	ON: When transmission speed is set to "625kbps".
			2.5M	ON: When transmission speed is set to "2.5Mbps".
			5M	ON: When transmission speed is set to "5Mbps".
			10M	ON: When transmission speed is set to "10Mbps".
		TEST	TEST	ON: Offline test in progress.
			S0	Not used
			S1	
			S2	
		SD		ON: Data being sent.
		RD		ON: Data being received.

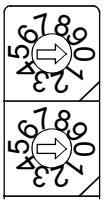
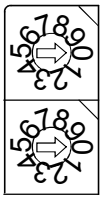
AJ61QBT11



A1SJ61QBT11

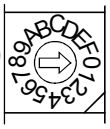
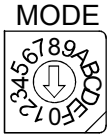


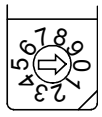
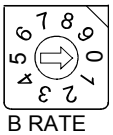
<table>
<tr><th>Number</th><th>Name</th><th>Description</th></tr>
<tr><td>(2)</td><td>Station number setting switch

AJ61QBT11
STATION NO.
X10
X1
 
A1SJ61QBT11
STATION NO.
X 10
X 1
  </td><td>Set the module station number.(Setting status when shipped: 0)

<Setting range>
• When remote net mode
Master station: 0
Local station: 1 to 64

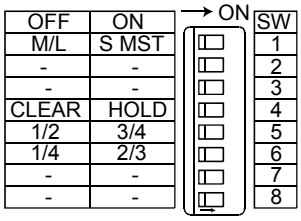
When set to a number not in the range 0 to 64, the "SW" and "L ERR." LEDs are turned on.
• When remote I/O net mode
Master station: 1 to 64 (set last station number of remote I/O station)
When set to 0, the "PLM" LED is turned on.</td></tr>
<tr><td>(3)</td><td>Mode setting switches

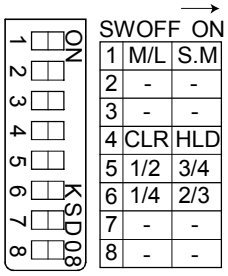
AJ61QBT11
MODE
0:ONLINE(A.R.)
1:ONLINE(RIM)
2:OFFLINE
 
A1SJ61QBT11
MODE
  </td><td>Set the operation status of the module (Setting status when shipped: 0)
<table><tr><th>Number</th><th>Names</th></tr><tr><td>0</td><td>Online (remote net mode)</td></tr><tr><td>1</td><td>Online (remote I/O net mode)</td></tr><tr><td>2</td><td>Offline</td></tr><tr><td>3</td><td>Line test 1 *1</td></tr><tr><td>4</td><td>Line test 2 *1</td></tr><tr><td>5</td><td>Parameter confirmation test *1</td></tr><tr><td>6</td><td>Hardware test</td></tr><tr><td>7</td><td>Setting error ("SW" LED turn on)</td></tr><tr><td>8 to A</td><td>Setting prohibited due to internal use</td></tr><tr><td>B to F</td><td>Setting error ("SW" LED turn on)</td></tr></table></td></tr>
<tr><td>(4)</td><td>Transmission speed setting switches

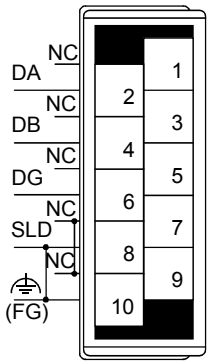
AJ61QBT11
 
<table><tr><td>B RATE</td><td></td></tr><tr><td>0</td><td>156K</td></tr><tr><td>1</td><td>625K</td></tr><tr><td>2</td><td>2.5M</td></tr><tr><td>3</td><td>5M</td></tr><tr><td>4</td><td>10M</td></tr></table>
A1SJ61QBT11
 
B RATE
<table><tr><td>0</td><td>156K</td></tr><tr><td>1</td><td>625K</td></tr><tr><td>2</td><td>2.5M</td></tr><tr><td>3</td><td>5M</td></tr><tr><td>4</td><td>10M</td></tr></table></td><td>Set transmission status of the module (Setting status when shipped: 0)
<table><tr><th>Number</th><th>Descriptions</th></tr><tr><td>0</td><td>156kbps</td></tr><tr><td>1</td><td>625kbps</td></tr><tr><td>2</td><td>2.5Mbps</td></tr><tr><td>3</td><td>5Mbps</td></tr><tr><td>4</td><td>10Mbps</td></tr><tr><td>5 to 9</td><td>Setting error ("SW" or "L ERR" LED turn on)</td></tr></table></td></tr>
</table>

*1: Use impossible at local station.

<table>
<tr><th>Number</th><th>Name</th><th>Description</th></tr>
<tr><td>(5)</td><td>Condition setting switches

AJ61QBT11
 
<table>
<tr><td>OFF</td><td>ON</td></tr>
<tr><td>M/L</td><td>S MST</td></tr>
<tr><td>-</td><td>-</td></tr>
<tr><td>-</td><td>-</td></tr>
<tr><td>CLEAR</td><td>HOLD</td></tr>
<tr><td>1/2</td><td>3/4</td></tr>
<tr><td>1/4</td><td>2/3</td></tr>
<tr><td>-</td><td>-</td></tr>
<tr><td>-</td><td>-</td></tr>
</table>

A1SJ61QBT11
 

<table>
<tr><td>SW</td><td>OFF</td><td>ON</td></tr>
<tr><td>1</td><td>M/L</td><td>S.M</td></tr>
<tr><td>2</td><td>-</td><td>-</td></tr>
<tr><td>3</td><td>-</td><td>-</td></tr>
<tr><td>4</td><td>CLR</td><td>HLD</td></tr>
<tr><td>5</td><td>1/2</td><td>3/4</td></tr>
<tr><td>6</td><td>1/4</td><td>2/3</td></tr>
<tr><td>7</td><td>-</td><td>-</td></tr>
<tr><td>8</td><td>-</td><td>-</td></tr>
</table>
</td><td>Set the operation condition (Setting status when shipped: All is off)
<table>
<tr><th>Number</th><th>Setting contents</th><th colspan="3">Description</th></tr>
<tr><td>SW1</td><td>Station type</td><td colspan="3">OFF: Master station/Local station
ON : Standby master station</td></tr>
<tr><td>SW2</td><td>(Unusable)</td><td colspan="3">Always OFF</td></tr>
<tr><td>SW3</td><td>(Unusable)</td><td colspan="3">Always OFF</td></tr>
<tr><td>SW4</td><td>Input data status of the data link error station</td><td colspan="3">OFF: Clear
ON : Hold</td></tr>
<tr><td rowspan="6">SW5
SW6</td><td rowspan="6">Number of occupied station</td><td>Number of occupied station</td><td>SW5</td><td>SW6</td></tr>
<tr><td>1 station</td><td>OFF</td><td>OFF</td></tr>
<tr><td>2 stations</td><td>OFF</td><td>ON</td></tr>
<tr><td>3 stations</td><td>ON</td><td>ON</td></tr>
<tr><td>4 stations</td><td>ON</td><td>OFF</td></tr>
<tr><td>SW7</td><td>(Unusable)</td><td colspan="3">Always OFF</td></tr>
<tr><td>SW8</td><td>(Unusable)</td><td colspan="3">Always OFF</td></tr>
</table>
</td></tr>
<tr><td>(6)</td><td>Terminal block
 

</td><td>Connecting the CC-Link dedicated cable of data link. The terminals showing below are connected inside the module.

• SLD (Terminal No. 8) and FG (Terminal No. 10)
• NC (Terminal No. 7) and NC (Terminal No. 9)

2-piece type terminal block. The module can be exchanged with another without removing the signal lines from the terminal block.</td></tr>
</table>

Point

(1) When the module is operated in synchronous mode, there may be occasions when the "L RUN" LED is only faintly lit.

(2) The setting contents for the switches (2) to (5) are valid when the module power supply status is OFF → ON.
When the setting contents are changed while the module power supply is ON, reset PLC CPU or turning the module power supply ON to OFF again.

Important

Do not use station number 64 in a system where the waiting master station exists.
When it is used, the station number 64 will not communicate correctly.

4. Loading and Installation

The following is explanations of the handling precautions and installation environment which is common to modules when handling AJ61QBT11 and A1SJ61QBT11 from unpacking to installation.
For the details of loading and installation of the module, refer to User's Manual of PLC CPU module to be used.

4.1 Handling precautions

The following is an explanation of handling precautions of the module.

(1) Because the case of the module is made of resin, be careful not to drop it or expose it to strong impact.

(2) Execute tightening of the module's installation screws within the range indicated below.

Screw location	Tightening torque range
Module installation screws (M4 screws)	78 to 118N·cm
Terminal-block terminal screws (M3.5 screws)	59 to 88N·cm
Terminal-block installation screws (M3.5 screws)	49 to 78N·cm

Point
Always turn the power of the corresponding station OFF before mounting or removing the terminal block. If the terminal bolck is mounted or removed without turning the corresponding station's power OFF, correct data transmission by the mounted or removed station will not be guaranteed.

4.2 Installation environment

For more details on the installation environment, refer to the user's manual for the PLC CPU module used.

5. External Wiring

5.1 Wiring the CC-Link dedicated cable

The connection method of the CC-Link dedicated cables for the master module, local module, standby master module, remote module and intelligent module are described.

(1) Connections can be made regardless of the station numbers.

(2) Always connect "terminal resistors" supplied with the module to the modules at both ends and between "DA" and "DB".

(3) In the CC-Link system, the terminal resistor that is connected differs depending on the cable used.

- When the CC-Link dedicated cable and the Version 1.10 compatible CC-Link dedicated cable are used:
  110Ω 1/2W (brown-brown-brown)
- When the CC-Link dedicated high-performance cable is used:
  130Ω 1/2W (brown-orange-brown)

(4) The master module can be connected besides to the ends.

(5) A star connection cannot be used.

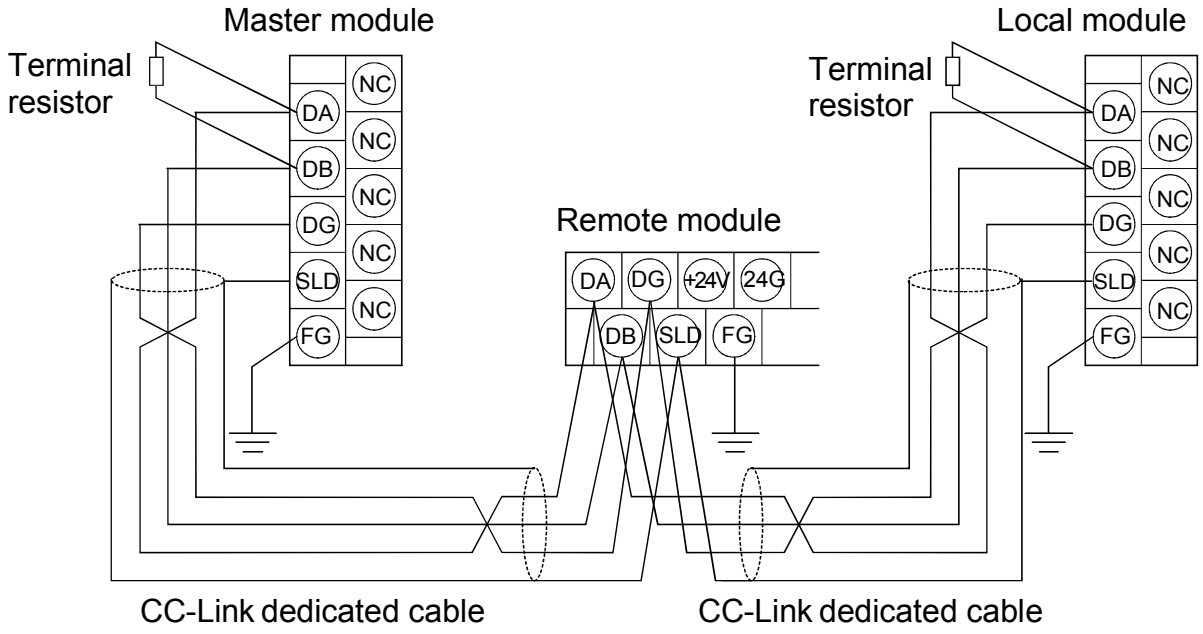
(6) The connection method is shown below.

Important

Each of Ver.1.10 compatible CC-Link cables, CC-Link dedicated cables (Ver.1.00), and CC-Link dedicated high-performance cables cannot be used together with other cable types.

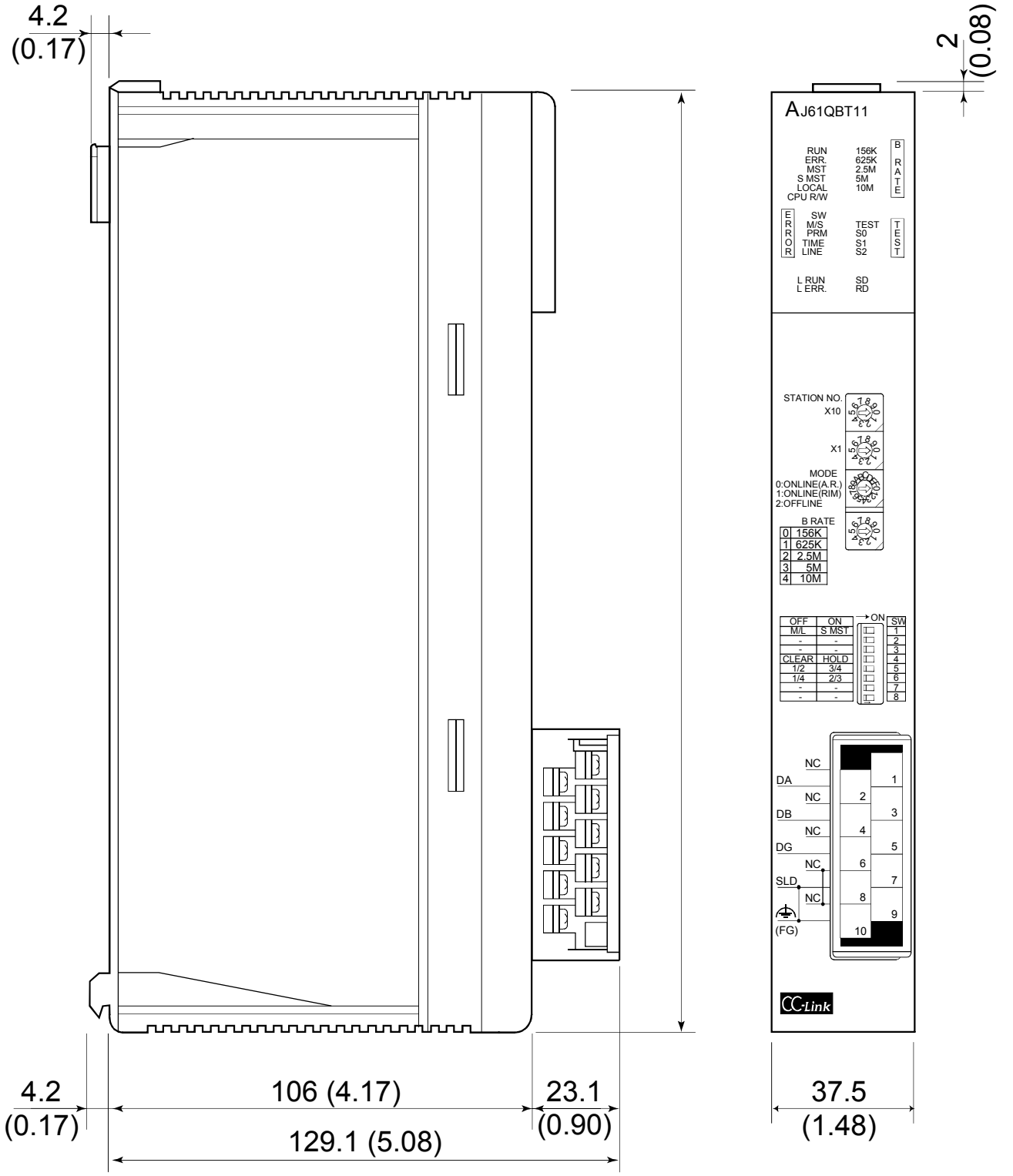
Point

The shielded CC-Link dedicated cable should go through "SLD" and "FG" in each module, and both ends should be grounded (class-D grounding). SLD and FG are connected inside the module.



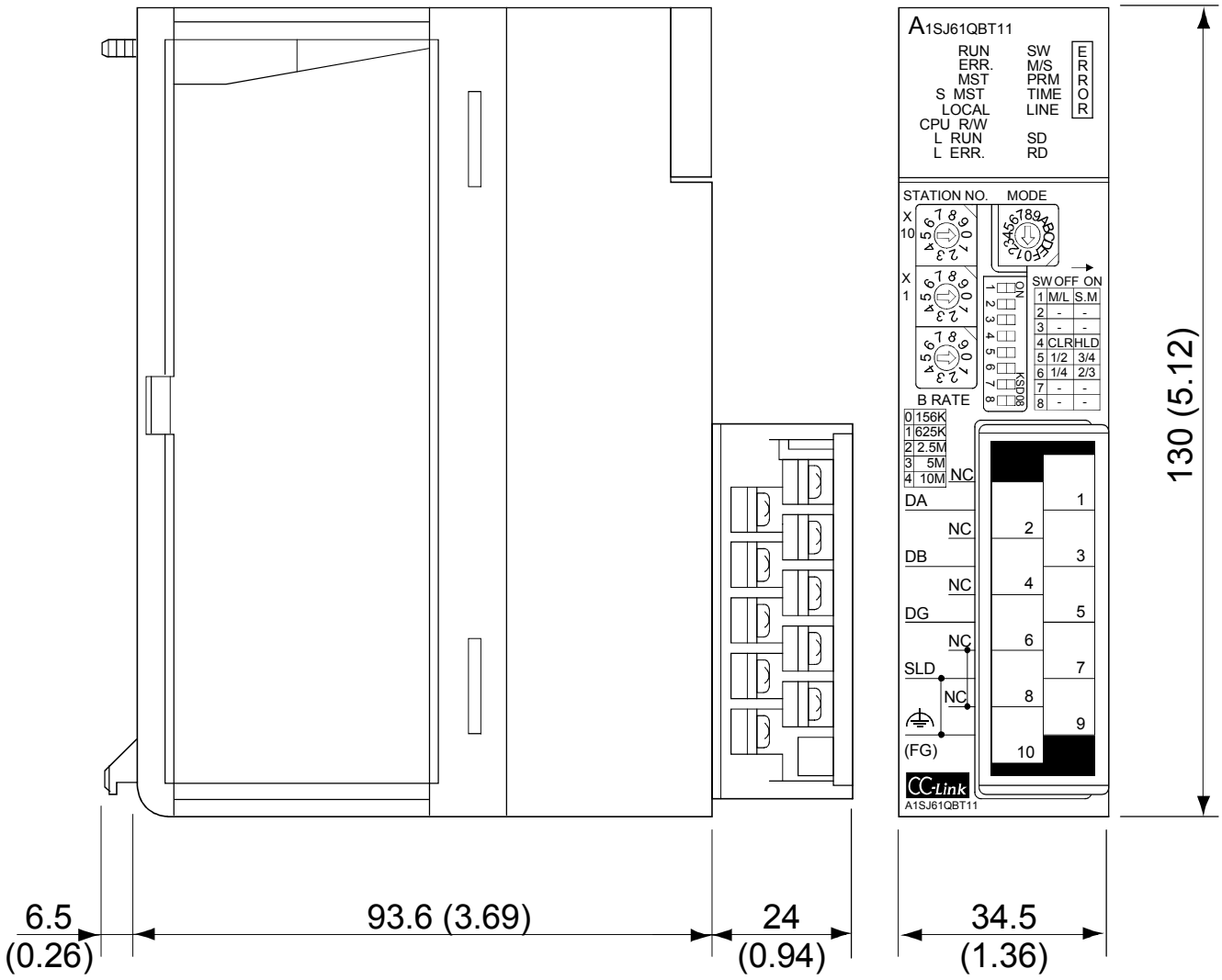
6. External Dimensions

6.1 AJ61QBT11



Unit: mm (inch)

6.2 A1SJ61QBT11



Unit: mm (inch)

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- Before using the product for special purposes such as nuclear power, electric power, aerospace, medicine or passenger movement vehicles, consult with Mitsubishi.
- This product has been manufactured under strict quality control. However, when installing the product where major accidents or losses could occur if the product fails, install appropriate backup or failsafe functions in the system.

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